

Amendment to the Claims:

1. (Previously Presented) A magnetic resonance imaging method for forming an image of an object from a plurality of signals sampled in a restricted homogeneity region of a main magnet field of a magnetic resonance imaging apparatus, wherein a patient disposed on a table is moved continuously through the bore of the main magnet and spins in a predetermined area of the patient are excited by an excitation pulse from a transmitter antenna, such that an image is formed over a region exceeding largely the restricted region, wherein data is undersampled in the restricted region by means of at least one receiver antenna in a plurality of receive situations being defined as a block of measurements contiguous in time having preserved magnetisation and presaturation conditions within the excited area of the patient, and fold-over artefacts due to said undersampling are unfolded by means of the sensitivity pattern of the receiver antenna and/or the properties of selected factors determining said receive situations.

2. (Currently Amended) A magnetic resonance imaging method as claimed in Claim 1, wherein the fold over artefacts are unfolded by means of for forming an image of a region of a patient that is larger than a restricted homogeneity region of a main magnet field of a magnetic resonance imaging apparatus from a plurality of signals sampled in the restricted homogeneity region, the method comprising:

continuously moving a patient through the restricted homogeneity region of the main magnet field;
exciting spins in an area of the patient in the restricted homogeneity region with an excitation profile as the patient moves through the main magnetic field,
undersampling resonance data in the restricted homogeneity region with receiver antennae which each have a sensitivity pattern as the patient moves through the main magnet field to define a block of measurements contiguous in time having preserved magnetisation and presaturation conditions within the excited region of the patient; and

generating the image of the region of the patient that is larger than the restricted homogeneity region including unfolding fold-over artifacts due to (a) the undersampling using the sensitivity patterns of the receiver antennae and (b) at least one of:

- 20 the excitation profile, ~~as selected factor~~
 a magnetization and presaturation profile, and
 a frequency-response pattern of a receiver.

3. (Previously Presented) A method as claimed in Claim 1, wherein the fold-over artefacts are unfolded by means of the magnetisation and presaturation profile as selected factor.

4. (Previously Presented) A method as claimed in Claim 1, wherein the fold-over artefacts are unfolded by means of the frequency-response pattern of the receiver as selected factor.

5. (Currently Amended) A method as claimed in Claim 1, wherein during sampling of data within the restricted homogeneity region the table ~~will be~~ is moved over at most one half of the size of the restricted homogeneity region.

6. (Currently Amended) A magnetic resonance imaging method as ~~claimed in Claim 1, wherein comprising:~~

forming a restricted homogeneity region of a main magnet field with a main magnet system of a magnetic resonance imaging apparatus;

5 continuously moving a patient disposed on a table through the restricted homogeneity region of the main magnet system;

exciting spins in a predetermined area of the patient with excitation pulses from a transmitter antenna as the patient moves through the restricted homogeneity region;

10 undersampling data from the restriction region with at least one global receiver antenna disposed in a fixed relationship to the main magnet system and a plurality of local receiver antennae disposed in a fixed relationship to the patient on

- the table ~~are provided~~ to move therewith to generate a block of measurements
contiguous in time having preserved magnetization and presaturation conditions
15 within the excited area of the patient;
reconstructing the block of measurements to generate images which
have fold-over artifacts due to the undersampling, the generated images spanning an
imaged region of the patient which is larger than the restricted homogeneity region;
and
20 unfolding fold-over artifacts using sensitivity patterns of the global
and local receiver antennae.

7. (Currently Amended) A method as claimed in claim ~~[[1]]~~ 6,
wherein a reference scan is ~~provided~~ performed for obtaining the sensitivity patterns
of the global and local receiver antennae.

8. (Currently Amended) A method as claimed in claim 7, wherein
data is acquired in a number of discrete reference scan segments at different table
positions in the restricted region, ~~whereas~~ wherein during each reference scan the
table stands still, and from the data obtained by the reference scans the sensitivity
5 patterns of the local coils receiver antennae are calculated.

9. (Currently Amended) A method as claimed in claim 7, wherein
the table is moved at a speed which is less than half of the restricted homogeneity
~~volume~~ region of the main magnet system over the scan time of k-space, ~~whereas~~
k-space ~~[[is]]~~ being continuously scanned in a row-to-row manner, and the sensitivity
5 profiles of the local coils receiver antennae being calculated by interpolation of
the measured profiles at different table positions.

10. (Currently Amended) A magnetic resonance imaging method as
~~claimed in claim 1;~~ for forming an image of an object from a plurality of signals
sampled in a restricted homogeneity region of a main magnet field of a magnetic
resonance imaging apparatus, wherein a patient disposed on a table is moved
5 continuously through the bore of the main magnet and spins a predetermined area of

the patient are excited by an excitation pulse from a transmitter antenna, such that an image is formed over a region exceeding largely the restriction region, wherein data is undersampled in the restriction region by means of at least one receiver antenna in a plurality of receive situations being defined as a block of measurements contiguous in time having preserved magnetization and presaturation conditions within the excited area of the patient, and fold-over artifacts due to said undersampling are unfolded by means of the sensitivity pattern of the receiver antenna and/or the properties of selected factors determining said receive situations, wherein the sampled data is reconstructed in an iterative manner, in that data sampled largely offset of the centre of the main magnet, which is folding-in on the data sampled in the centre of the main magnet, is purposely distorted such that a undistorted image is reconstructed and subtracted from the fold-in image.

11. (Currently Amended) A magnetic resonance imaging apparatus for obtaining an MR image from a plurality of signals comprising:

- a main magnet which generates a main magnet field having a restricted homogeneity region,
- a transmitter antenna for excitation of spins in a predetermined area of the patient with an excitation profile,
- at least one receiver antenna for sampling a plurality of signals in a restricted homogeneity region of the main magnet field,
- a table for bearing a patient,
- means for continuously moving the table through the ~~bore~~ restricted homogeneity region of the main magnet field,
- means for adapting the frequency profile of the transmitter antenna and the frequency profile of the receiver antenna to the position of the continuously moving table relative to a reference point,
- means for sampling the data from the spins excited in the restricted homogeneity region in a given receive situation being defined as a block of measurements contiguous in time with preserved magnetisation and presaturation conditions in the excited area of the patient, and

20 - means for unfolding fold-over artefacts due to undersampling by
means of the sensitivity pattern of the receiver antenna and/or the properties of
selected factors determining said receive situations and at least one of:

the excitation profile,

a magnetization and presaturation profile, and

25 a frequency-response pattern of a receiver that
demodulates the data sampled by the at least one receiver antenna.

12. (Currently Amended) A magnetic resonance imaging apparatus
for obtaining an MR image from a plurality of signals ~~Apparatus according to~~
~~Claim 11, further comprising:~~

5 - a main magnet system which generates a main magnet field having
a restricted homogeneity region,

- a table for bearing a patient,

- a means for continuously moving the table through a bore of the
main magnet system,

10 - a transmitter antenna for excitation of spins in a predetermined area
of the patient,

- a plurality of receiver antennae for sampling a plurality of signals
from the restricted homogeneity region including at least one global receiver antenna
disposed at a fixed relationship to the main magnet system and a plurality of local
receiver antennae disposed in a fixed relationship to the patient on the table,

15 - a means for adapting a frequency profile of the transmitter antenna
and a frequency profile of the receiver antennae to the position of the continuously
moving table relative to a reference point,

- means for sampling the data in the restricted homogeneity region in
a given receive situation being defined as a block of measurements contiguous in time
20 with preserved magnetization and presaturation conditions in the excited area of the
patient, and

- means for unfolding fold-over artifacts due to undersampling by
means of the sensitivity pattern of the receiver antennae.

13. (Currently Amended) A computer program product stored on a computer usable medium for forming an image ~~by means of the magnetic resonance method~~, comprising a computer readable program means for causing the computer to control the execution:

- 5 - creating a main magnetic field by a main magnet,
- ~~excitation of~~ exciting spins in a predetermined area of the patient by a transmitter antenna,
- sampling a plurality of signals in a restricted homogeneity region of the main magnet field by at least one receiver antenna,
- 10 - continuously moving a table bearing a patient through ~~the~~ a bore of the main magnet,
- adapting ~~the~~ a frequency profile of the transmitter antenna and ~~the~~ a frequency profile of the receiver antenna to the position of the continuously moving table relative to a reference point,
- 15 - undersampling the data in the restricted region in a given receive situation being defined as a block of measurements contiguous in time with preserved magnetisation and presaturation conditions in the excited area of the patient, and
- generating an image of a region of the patient longer than the restricted homogeneity region including unfolding fold-over artefacts due to said by
- 20 means of undersampling, the unfolding being in conjunction with the sensitivity pattern of the receiver antenna and/or the properties of selected factors determining said receive situations and at least one of:
 - the excitation profile,
 - a magnetization and presaturation profile, and
 - 25 a frequency-response pattern of a receiver that demodulates the signals sampled by the at least one receiver antenna.

14. (New) A computer program product stored on a computer usable medium for forming an image, comprising a computer readable program means for causing the computer to perform the method as claimed in claim 1.

15. (New) A magnetic resonance imaging apparatus having a processor programmed to perform the method as claimed in claim 1.

16. (New) The method as claimed in claim 1, further including defining slices in a canted orientation to orient artifacts in a preselected direction.